

Cervical Spondylomyelopathy in Small-Breed Dogs

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Abstract : Cervical spondylomyelopathy (CSM) is rarely identified in small-breed dogs. Two neutered female Pekingese dogs (less than 5 kg of body weight) with primary complaints of neck pain and paretic gait were presented. These cases were diagnosed as CSM secondary to vertebral instability through cervical survey radiography, myelography, computed tomography (CT) and CT-myelography. The combinatory treatments of ventral slot decompression, cancellous bone graft and external coaptation were performed. Clinical condition of both dogs remarkably improved and no complications or recurrence occurred following the surgical procedures. In small-breed dogs with CSM, the combination of decompression through ventral slot and stabilization through bone fusion is an effective treatment.

Key words : cervical spondylomyelopathy, vertebral instability, surgery, small-breed dog.

Introduction

Cervical spondylomyelopathy (CSM) is a neurological disorder distinguished by spinal cord compression as a result of degenerative changes in the cervical vertebrae and intervertebral disks (6,9). Classically this disease is identified most commonly in Dobermans, Great Danes, and other large-, giant-breed dogs (2,6,8). However, identical changes have been noted very rarely in small-breed dogs such as the Yorkshire Terrier and Maltese (3).

The present report describes the diagnosis and successful treatment of cervical spondylomyelopathy in two small-breed dogs.

Case

Two small-breed dogs were presented to the Veterinary Medical Teaching Hospital of Seoul National University with neck pain and tetraparesis. The dogs were a 9-year-old and a 6-year-old neutered female Pekingese. The first dog was referred with apparent neck pain, progressive ataxia and non-ambulatory tetraparesis. Abnormal alignment of 5th and 6th cervical vertebrae (C5-C6), intervertebral space narrowing of C2-C3, C3-C4, C4-C5, C6-C7 and ventral spur formation of C3-C4, C4-C5, C6-C7 were identified on survey radiographs (Fig 1). On CT, in spite of ventral compression by disk protrusion at C5-C6, the spinal cord was ventrally compressed, rather than dorsally (Fig 1). It was thought that obstructive tissues might have prevented dorsal movement of the spinal cord by disk protrusion. Therefore, dorsal decompressive sur-

gery was performed. Approaching C5-C6 through the dorsal side, malarticulation, joint capsule proliferation and interarcu-

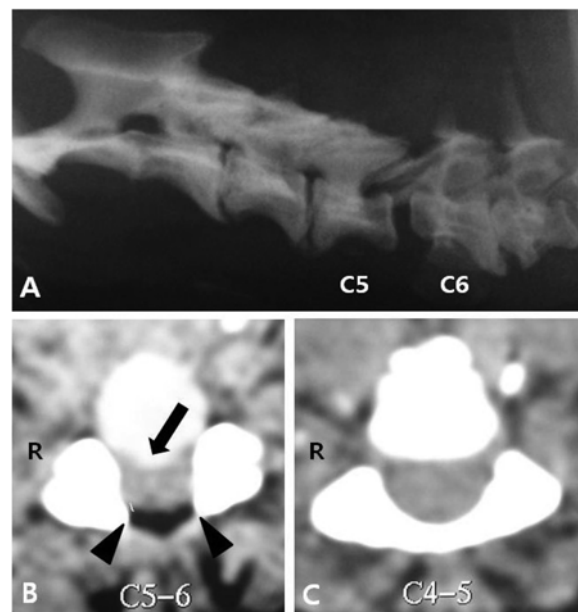


Fig 1. Cervical radiograph and CT imaging of a 9-year-old neutered female Pekingese with neck pain and tetraparesis. The lateral survey radiograph (A) shows the abnormal alignment of C5-C6. Transverse CT image at the level of the intervertebral space of C5-C6 (B) shows the ventral compression of the spinal cord by disk protrusion (arrow) and highlighting the ventrally compressed spinal cord, which has not dorsally deviated by ventral disk protrusion. This is thought because of the dorsolateral compression of the spinal cord (arrow head) by secondary soft tissue changes. Transverse CT image at C4-5 (C) shows the normal appearance of the spinal cord.

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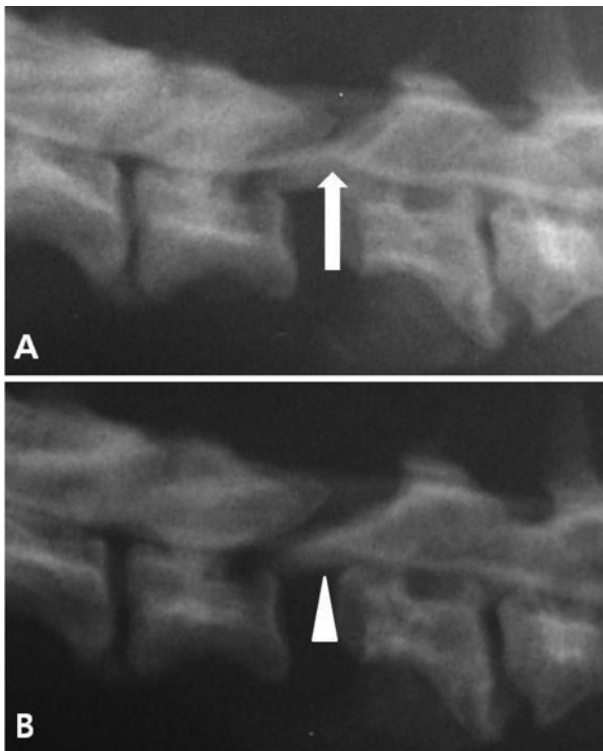


Fig 2. Lateral cervical myelogram from a 9-year-old neutered female Pekingese with neck pain and tetraparesis. (A) Ventral spinal cord compression (arrow) at C5-C6 associated with disk protrusion. (B) Marked relief of spinal compression (arrow head) with traction applied to the vertebral column.

ate ligament hypertrophy were identified. Excisions of the joint capsule and interarcuate ligament were performed for spinal cord decompression. Consequently, it was thought that vertebral instability would produce spinal cord compression by secondary soft tissue changes. A neck brace was used for cervical stabilization following dorsal decompressive operation instead of internal fixation, because the dog was too small. Since then, the dog showed progressive improvement of clinical signs including normal gait and no cervical pain.

After five months of follow up, there was a recurrence of the same clinical signs. Ventral spinal cord compression was identified at C5-C6 on lateral cervical myelogram (Fig 2). Spinal cord compression was reduced by traction. Myelography combined with CT was used to diagnose CSM and to plan surgical treatment (Fig 3). On CT-myelography, marked ventral spinal cord compression due to dorsal protrusion of the intervertebral disk was identified. Also symmetrical, dorsolateral and extradural compressions caused by soft tissues adjacent to the articular facet joints were evident. A cement plug was applied to C5-C6 for traction-responsive lesions. The clinical signs were improved the following the operation. But clinical signs deteriorated on the third day after the operation and implant failure was observed on survey radiographs. Next, ventral slot decompression technique was used. Through a ventral slot, the induration of the dura mater was observed

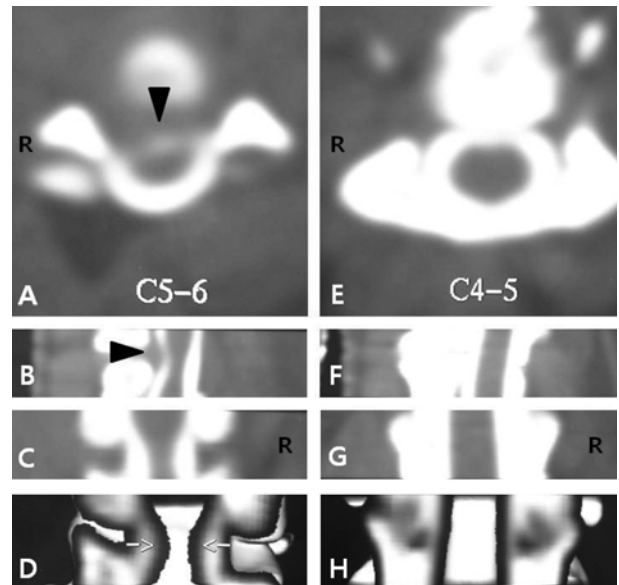


Fig 3. CT myelogram images from a 9-year-old neutered female Pekingese with neck pain at C5-C6 (A), (B), (C), (D) and C4-C5 (E), (F), (G), (H). (A), (E) present transverse view and (B), (F) present sagittal view. (C), (G) are dorsal view at the level of the articular processes and (D), (H) are 3D reconstruction at the same level. CT myelogram at C4-C5 shows the normal appearance of the spinal cord. (A), (B) show the ventral compression of the spinal cord (arrow head). (C), (D) reveal the dorsolateral compression of the spinal cord (arrow).

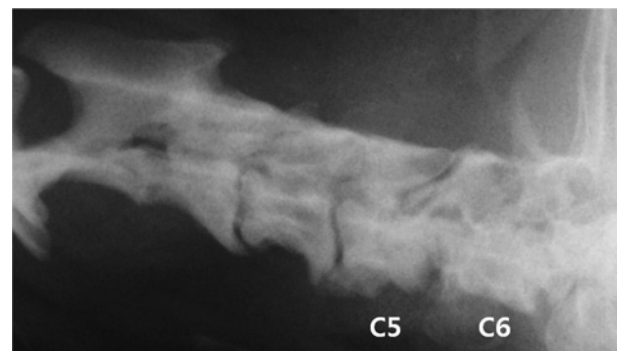


Fig 4. Four-month postoperative radiograph of a Pekingese treated using ventral slot decompression, cancellous bone graft and external coaptation. Osseous fusion and good alignment of C5-C6 are revealed.

and the durotomy was performed. After a ventral slot adjacent to the outer cortical bone was removed over the half ventral aspect of the caudal C5 and cranial C6 vertebrae, the cancellous bone collected from the proximal humerus was applied over the disc space for bone union. Clinical signs were improved following the operation. Four-month follow-up radiograph showed osseous fusion and good alignment at C5-C6 (Fig 4). After eleven months of follow up from the ventral slot and C5-C6 fusion, there was no recurrence of the clinical signs.

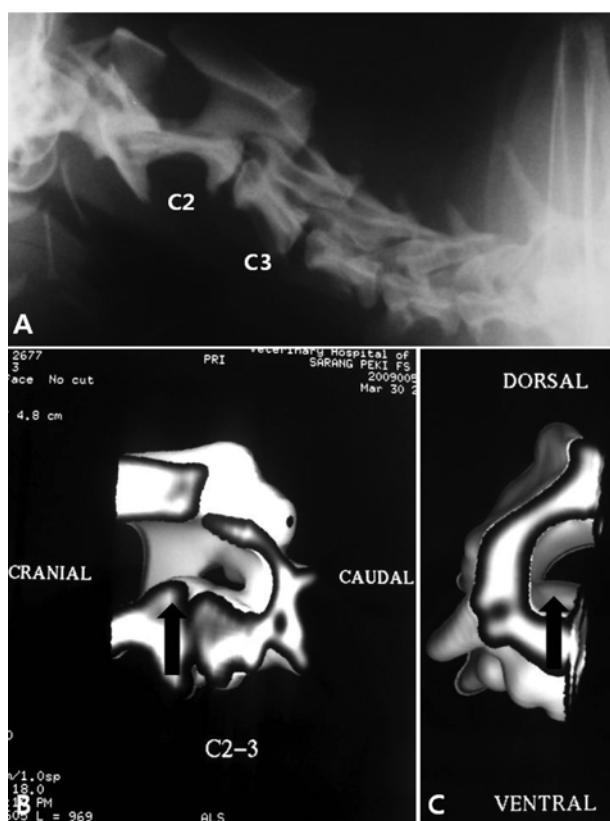


Fig 5. Cervical radiograph and 3-D reconstructed images of a 6-year-old neutered female Pekingese with cervical pain and parietic gait. The survey radiograph (A) shows angulated alignment of C2-C3. (B), (C) 3D reconstruction shows the overgrowth of the vertebral body and also demonstrates prominent impingement of dorsal spur into the vertebral canal (arrow).

The second dog was presented with cervical pain and mild parietic gait. Angulated alignment of C2-C3 was recognized on survey radiographs (Fig 5). Ventral spinal cord compression by vertebral canal stenosis and disk protrusion at C2-C3 was identified on CT (Fig 5). The ventral slot decompression was performed at C2-C3. Like the first case, cancellous bone graft and neck brace were used instead of internal fixation for vertebral stability. Clinical signs were improved following surgery. After eleven months of follow up from the surgery, there was no recurrence of the clinical signs.

Discussion

In these two cases, abnormal alignments of the cervical vertebra were observed on survey radiographs. Vertebral canal stenosis (osseous compressive lesions) and secondary soft tissue changes (soft tissue compressive lesions) were identified on CT and/or CT-myelography. Vertebral instability, malarticulation, joint capsule proliferation and interarcuate ligament hypertrophy were also identified during the operations. Through these results, low grade vertebral instability was suggested to be the key factor behind spinal cord compression

by cervical vertebral malformation and/or secondary soft tissue changes. Previously, the pathogenesis of behind this change has been poorly understood and considered to be multifactorial, but vertebral instability is known to be an important contributor (7,13). Vertebral instability may also result from primary degeneration of the intervertebral disk, especially in chondrodystrophoid and other small-breed dogs (12). Consequently, chronic degenerative disk disease in small-breed dogs may be the cause and/or effect of vertebral instability.

The objectives of surgical intervention in the dog with CSM are decompression and/or stabilization of the cervical spine. A large number of different surgical techniques reveal the difficulty in treating CSM (1,2,4,5,13). Surgical techniques include the ventral slot, distraction-stabilization and dorsal laminectomy, and surgical choice depends chiefly on the type of the compression, especially according to traction views via myelography (9). Additional factors include the number of lesions and the degree of vertebral malformation (9). Any surgical procedure in relation to the size of patients has not been reported because this syndrome is classically considered as a disease of large- and giant-breed dogs. Therefore, the application of these surgical techniques is difficult in small-breed dogs with CSM due to scale. The cement plug technique was used in the present case, but the space filled with bone cement was too limited. Bone cement easily fell out of the space within 2 days after the operation with deterioration of clinical signs. The vertebral distraction-stabilization methods now recommended for large dogs with CSM are the cement plug, locking plate, and metal implant and bone cement techniques (9,10,11). The cement plug and locking plate need a broader intervertebral disk space, and the metal implant and bone cement technique have a greater risk of the implant failure or the vertebral fracture in small-breed dogs because of the small vertebral body. Therefore, it is thought that the distraction-stabilization techniques may be difficult to be applied in small-breed dogs. It is suggested that combination of ventral slot (decompression), cancellous bone graft and neck brace (stabilization) used in the present cases is relatively effective and safe method to treat CSM in small-breed dogs, regardless of traction responsive lesions.

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소형 품종 견에서 경추의 척추척수증

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요 약 : 경추 척추척수증(CSM)은 소형 품종 견에서 드물게 발생하는 질병이다. 두 마리의 중성화 하지 않은 페키니즈(체중 5 kg 이하)가 경부 통증과 마비성 보행을 주증으로 내원하였다. 영상 진단을 통해 척추 불안정성에 의한 CSM으로 진단하고, 배쪽 창념술과 해면질골 이식, 외고정을 조합한 방법을 적용하였다. 수술 후 임상 증상이 현저하게 개선되었고 합병증이나 재발은 없었다. 경추의 척추척수증이 있는 소형 품종 견에서 배쪽 창념술을 통한 감압과 골 유합을 통한 안정화를 조합한 방법은 효과적인 치료법임을 확인하였다.

주요어 : 경추 척추척수증, 척추 불안정성, 수술, 소형 품종 견.